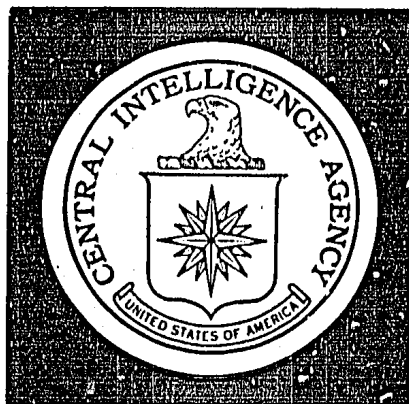


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DIRECTORATE OF
INTELLIGENCE

Intelligence Memorandum

*North Korea: Continued Growth Of Electronic Imports
From The Free World*

~~Secret~~

ER IM 70-76
June 1970

Copy No. 48

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
June 1970

INTELLIGENCE MEMORANDUM

North Korea:
Continued Growth Of Electronic Imports
From The Free World

Introduction

North Korea again imported a record amount of electronic equipment from the Free World in 1969, sustaining a trend which began in 1967, and these imports are continuing at a high level in 1970. This memorandum presents data on the volume, value, and origin of the recent imports. It also examines the nature of the imported equipment in an effort to determine its probable end uses and hence its significance for P'yongyang's military and industrial programs.

North Korean imports of electronic equipment from the Communist countries are not included in this memorandum. Currently, the electronic imports from these countries appear to be restricted to a few air defense radars per year from Communist China and the USSR and some military communications and industrial electronic equipment from the USSR and Eastern Europe.

Trend and Origin of Recent Imports
from the Free World

1. [REDACTED]

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[REDACTED] North Korea has been
importing a rapidly growing volume of electronic

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equipment from the Free World since 1966. As shown in Table 1, the value of these purchases in 1969 -- about \$3.5 million -- was double that in 1968 and more than eleven times that in 1966. Nearly all of this equipment has been supplied by electronics firms in Japan, although in 1969 the Koreans also began purchasing a small amount of navigation and communications apparatus from the United Kingdom, France, and West Germany.

Factory Equipment for Semiconductor Manufacture

2. In a significant departure from earlier practice, North Korea in 1969 purchased from the Free World equipment and technology for the manufacture of electronic components, specifically integrated circuits and transistors. Electronic imports from non-Communist countries previously had not included any capital equipment or technical data. A contract with the Japanese firm of Kokusai Electric Company was signed in August 1968, with delivery to begin within six months. As of July 1969, all of the equipment had cleared Japanese customs, and by December 1969 shipments were completed. Examination of data pertaining to this contract shows that all of the equipment needed to produce integrated circuits was included except precision mask-making equipment. Separate negotiations for this equipment with another Japanese firm, Dai Nippon Screen Manufacturing Company, took place during June 1969, and by September 1969 financial and shipping arrangements were being made.

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[REDACTED]

The total value of the semiconductor equipment supplied to North Korea is not known, but has been estimated conservatively at around \$700,000. A US electronics engineer's technical brief in 1969 stated that in the United States a total investment of \$500,000 for capital equipment would provide a production capability for up to 10,000 integrated circuits a week.

3. Before the import of this new technology and equipment, North Korea's electronics industry consisted of ten plants, all of which were built with Soviet or Chinese assistance. By modern standards the industry was small and backward, output being limited mainly to a few products and components of earlier vintage such as radio and telephone equipment, other communications apparatus, and various components, including vacuum tubes (see Table 2). Recognition of Free World superiority in electronics technology probably explains why P'yongyang turned to Japan in 1969 to obtain the semiconductor plant and, more recently, to negotiate for the purchase of an electronic instruments plant.

4. Acquisition of the semiconductor equipment and technology extends North Korea's electronic manufacturing capabilities into new areas. The new equipment and technology, assuming continued engineering and operational assistance from the Japanese, will enable the North Koreans eventually to start producing integrated circuits and transistors which, in turn, will assist them in shifting to production of modern communications apparatus that is more reliable, lighter in weight, less bulky, and more durable than the older models that are now being turned out. Mastering the production of semiconductors thus will help to reduce P'yongyang's dependence on foreign suppliers of electronic equipment and components. At the same time, it will be laying part of the groundwork for future development of North Korea's electronics industry.

Marine Navigation Equipment

5. Until 1969 the largest single category of electronic apparatus imported by North Korea from the Free World had been marine navigation equipment

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(see Figure 1). This equipment -- consisting of small marine radars, loran receivers, radio buoys, and magnetic compasses* -- has many applications in merchant navigation, but has been found on the small number of infiltration craft which North Korea uses to land agents in South Korea. In the case of the marine radars, North Korean documents captured in 1966 disclosed plans to equip all infiltration craft with such devices.

6. During 1969, at least 100 marine radars were imported, compared with 154 in 1968, 70 in 1967, and 20 in 1966. At least 68 radar antenna units were also imported in 1969 to be used as replacements and as permanent installations requiring only portable display and power units to operate as a complete radar. Almost all the radars imported were either models FR151F, FR151B, FR151P, or FR151TR -- manufactured by Furuno Company, Ltd., types that have a detection range of either 32 or 40 nautical miles. They indicate the contour of the landing area and show the location of any vessels in the area, thus facilitating marine operations, including agent infiltrations, especially in periods of darkness and poor weather.

7. In 1969, North Korea imported at least 130 Furuno-manufactured loran receivers compared with a total of 83 sets during 1966-68. A loran receiver is a device designed to receive pulsed radio signals from two sets of transmitters, thus assisting a navigator in determining the exact position of his ship. Captured North Korean infiltration craft have been equipped with these receivers.

8. During 1968-69 the variety of marine navigation equipment being imported was expanded to include radio buoys and magnetic compasses. At least 90 radio buoys, and 70 precision magnetic compasses valued at almost \$800 each, were purchased during this period. The radio buoys emit signals that provide navigational aid for ships and, being small and portable, can be deployed rapidly in rivers, estuaries, and harbors, as well as at sea. They are particularly useful when time is a controlling factor for the success of an operation.

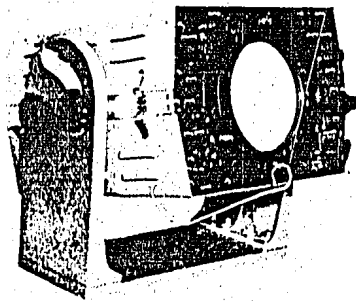
* Although these compasses are not electronic, they are important navigation instruments.

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Figure 1
EXAMPLES OF IMPORTED JAPANESE MARINE NAVIGATION EQUIPMENT

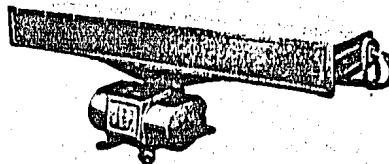
JAPANESE FURUNO 151B MARINE RADAR

Display Unit



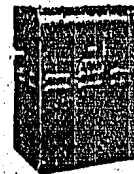
Width: 13.4"
Height: 9.8"
Depth: 15.7"

Radar Antenna



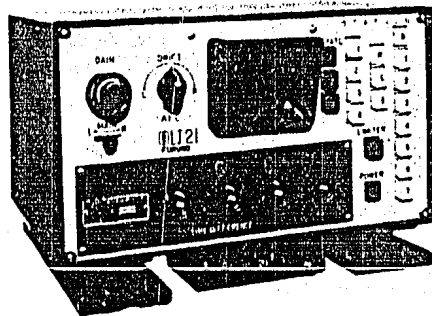
Height: 14.6"
Length: 55"

High-Frequency
Power Unit



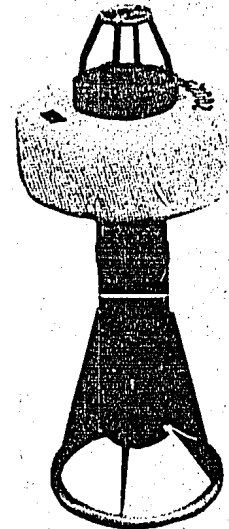
Width: 11.8"
Height: 17.7"
Depth: 9.4"

Japanese Furuno LJ21 Loran Receiver



Width: 12.2"
Height: 8.7"
Depth: 10.6"

Japanese Anritsu
AV-34B Radio Buoy



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9. The next largest category of Free World electronic equipment imported during 1966-69 consisted of communications equipment suitable for both civilian and military needs. These imports, consisting of radio, telephone, and telegraph communications equipment, rose in 1969 to about \$764,000 -- almost double the total value of such imports during 1966-68. The high value resulted mainly from increased imports of very-high-frequency radio telephone systems and long-, medium-, and short-wave transmission and reception apparatus.

10. Imports of communications equipment for military use have increased significantly (see Figure 2). At least 851 portable communications transceivers were imported during 1968-69 at a cost of about \$93,000 -- about 15 times the combined value of such imports during 1966-67. The imported transceivers were manufactured by Hitachi, Sony, Osaka-Onkyo, and Japan National Radio Corporation.

[REDACTED] A number of transceivers manufactured by North Korea and Japan have been seized from North Korean agents captured in South Korea (see Figure 2).

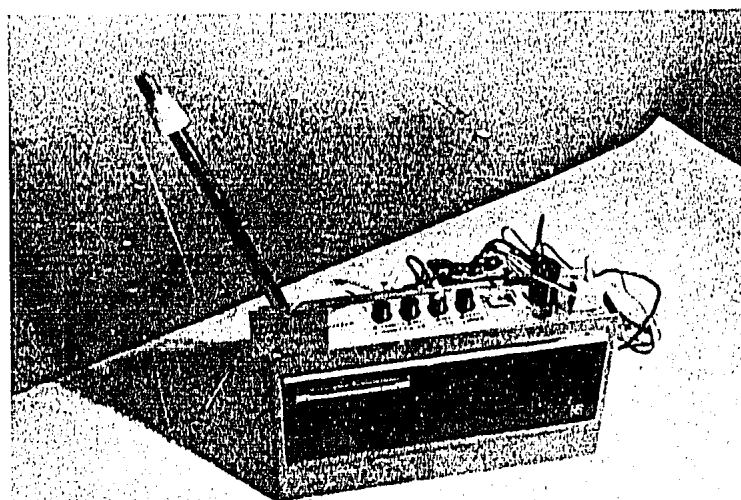
25X1
25X1Data Collection and Recording Equipment

11. Japanese trade statistics and other reports indicate that during 1969 North Korea imported at least 1,074 audio tape recorders, 20 analog recorders, accessories, and an unknown number of video recorders valued at \$323,000 (see Figure 3). Most of the audio tape recorders and video recorders were manufactured by the Sony Corporation. The audio tape recorders in addition to normal nonmilitary usage can be used to record and analyze foreign diplomatic and military communications. The video recorders are capable of recording simultaneously multichannel signals passed on US and South Korean communications nets. They also can be used for continuous monitoring of radar emissions and thus could enable the North Koreans to make detailed records of radar signals operating against them. The recorded data could assist in giving P'yongyang the capability to jam US and South Korean radar signals.

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Figure 2

EXAMPLES OF IMPORTED JAPANESE COMMUNICATIONS EQUIPMENT



Communications transceiver - found on a captured infiltration craft. Manufactured by Osaka-Onkyo.

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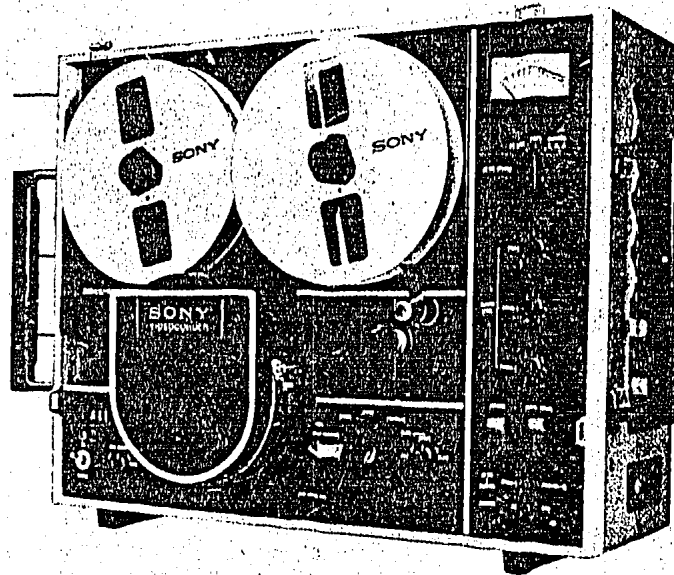
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Figure 3

EXAMPLES OF IMPORTED JAPANESE DATA COLLECTING
AND RECORDING EQUIPMENT



TEAC R400 Analog Data
Recorder



Sony EV-200 Video Recorder



Sony TC 777 Audio Recorder

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12. Twenty analog data recorders manufactured by Teac were exported to North Korea in 1969 by means of an administrative exception,* compared with 15 in 1968 and none during 1966-67. These recorders could be used to receive and record foreign communications intelligence.

Replacement Parts and Components

13. Imports of parts and components for use in electronic equipment increased more than eight times during 1966-69. Among the imports were cathode ray tubes, inductors, klystrons, and semiconductor devices -- all used in North Korea's imported radar and communications equipment. Since much of the equipment imported by North Korea is transistorized, imports of semiconductor devices have shown a large increase since 1966. North Korea has a general capability to manufacture military communications equipment but cannot produce certain modern components. The import of semiconductor manufacturing equipment in 1969, however, should in the future lessen the need for importing some of these components.

Miscellaneous Equipment

14. Imports of miscellaneous electronic equipment rose from about \$105,000 in 1966 to a peak of about \$477,000 in 1968 and then declined to about \$444,000 in 1969. This category comprised industrial control equipment and instruments used to maintain and calibrate recorders, radars, and communications equipment. Examples of such instruments are signal generators, oscilloscopes, synchrosopes, and frequency-measuring devices. In addition, several pieces of microwave test equipment imported by North Korea in 1969 covered the frequency ranges of SAM system fire-control radars and Barlock ground-control-intercept radars. This equipment should help to improve the performance of North Korea's radar network.

* *Shipment of these data recorders to North Korea is prohibited under item 1572A of COCOM International List I. An administrative exception allows certain pieces of embargoed equipment to be exported.*

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15. With the import from Japan in 1969 of plant and technology for the production of integrated circuits and transistors, North Korea took a major step toward updating its electronics industry. Once production of semiconductors is mastered and assuming continued Japanese technical assistance, subsequent steps in the modernization probably will include conversion to production of redesigned, solid-state communications equipment for military use as well as initiation of production of other modern electronic apparatus for both civilian and military use.

16. In 1969, North Korean imports of all kinds of electronic equipment from the Free World again reached a new peak. The value of these purchases -- about \$3.5 million -- was double that in 1968 and more than eleven times that in 1966. As in recent years, nearly all of this equipment imported in 1969 was supplied by electronics firms in Japan.

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17. Examination of the nature of North Korea's electronic imports from the Free World in 1969 shows continued stress on imports of equipment that has potential military uses. These items -- marine navigation equipment, communications equipment, equipment for collecting and recording data, and replacement parts and components -- comprised by value about two-thirds of the electronic imports in 1969. Moreover, many of the types of the military-associated equipment imported in 1969 have been identified as previously used by North Koreans in infiltration and paramilitary missions, suggesting that in 1969 P'yongyang intended to maintain a capability to mount such operations against South Korea.

Table 1

North Korea: Estimated Imports of Electronic Equipment from the Free World

	US \$			
	1966	1967	1968	1969
Semiconductor manufacturing equipment	<u>0</u>	<u>0</u>	<u>0</u>	<u>700,000</u>
Marine navigation equipment	<u>66,520</u>	<u>320,460</u>	<u>497,617</u>	<u>634,000</u>
Marine radar	56,620	212,000	431,200	467,000
Loran receivers	9,900	108,460	21,000	127,000
Radio buoys and magnetic compasses	0	0	45,417	40,000
Communications equipment	<u>41,810</u>	<u>66,471</u>	<u>312,171</u>	<u>763,959</u>
Transceivers	1,373	4,706	71,104	22,319
Radio, telephone, and telegraph communications equipment	40,437	61,765	241,067	741,640
Data collection and recording equipment	<u>25,147</u>	<u>17,207</u>	<u>227,712</u>	<u>323,233</u>
Audio tape recorders, tube type, portable	5,253	--	27,292	--
Audio tape recorders, transistorized, portable	467	4,745	69,903	135,794
Video tape recorders	5,409	--	42,759	28,000
Analog data recorders	--	--	63,496	100,906
Parts	2,106	867	5,242	8,133
Recording tape	11,912	11,595	21,020	50,400
Replacement parts and components	<u>63,779</u>	<u>124,908</u>	<u>201,426</u>	<u>594,008</u>
Miscellaneous equipment	<u>104,744</u>	<u>72,954</u>	<u>477,074</u>	<u>443,800</u>
<i>Total</i>	<i>302,000</i>	<i>602,000</i>	<i>1,716,000</i>	<i>3,459,000</i>

Table 2

North Korea: Electronics Plants

Name of Plant		Products
Anju Communications Equipment Plant		Wire broadcasting equipment and telephone equipment.
Ch'ondong Communications Equipment and Material Plant <u>a</u> /		Military radio communications equipment and parts, including copy of Soviet R105 transmitter/receiver. Plant also repairs chemical and radiation equipment.
Huichon-up Communications Equipment Plant <u>a</u> /		Electronic tubes, military wire communications equipment, and military radio communications equipment; also is probable location of imported semiconductor manufacturing equipment.
Kanggye Communications Factory		Military wire communications equipment.
Mupyong-ni Communications Equipment Plant <u>a</u> /		Military radio and wire communications equipment, including copy of Soviet R108 transmitter/receiver.

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Table 2

North Korea: Electronics Plants
(Continued)

Name of Plant		Products
Nampo Communications Equip- ment Plant <u>a</u> /		Primarily civilian electronics, including radios, television sets, telephone equipment, and small amounts of military telecommuni- cations equipment.
Pyorha-ri Signal Equipment Plant <u>a</u> /		Military radio and telephone equipment.
P'yongyang Electric Machine Plant		Primarily electric motors but has produced radios, telephone equipment, and test instruments for the military.
P'yongyang Electric Bulb Plant		Small quantities of electronic tubes that could be used in military communications equip- ment.
P'yongyang Communications Equipment Plant		Military and civilian wire com- munications equipment.

a. Most important plants in terms of production output.

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